Flood Loss Reduction Efforts Continue

On September 15, 2003, severe flooding associated with the remnants of Tropical Storm Henri occurred in the Red Clay Creek Watershed, which drains portions of Pennsylvania and Delaware. Chester County, Pa. near the Delaware state line was particularly hard hit. The Delaware Geological Survey reported that more than 10 inches of rain fell in a five-hour period, resulting in estimated damages to dwellings and structures exceeding $43 million in New Castle County, Del. A similar precipitation event in June 2001 caused by Tropical Storm Allison resulted in damages totaling $35 million over portions of Bucks and Montgomery counties in Pennsylvania. Such flood damages illustrate the continuing need for maintaining and improving flood warning systems as well as developing and implementing flood mitigation programs.

Extensive flood-related information can be found on the DRBC web site at http://www.nj.gov/drbc/Flood_Website/floodinf.htm.

Flood Warning

A set of flood warning recommendations for the Delaware Basin originally developed in 2001 by commission staff with guidance from the DRBC's Flood Advisory Committee was updated in 2002. A July 2002 report to the commissioners from then-committee chair Clark D. Gilman, which included these updated recommendations, appears on the DRBC web site at http://www.nj.gov/drbc/Flood_Website/july02rpt.htm. DRBC staff members have been working with the National Weather Service (NWS) to pursue funding for the recommendations, which would provide the data and equipment needed to support development of the Advanced Hydrologic Prediction Services (AHPS) in the basin. The AHPS program provides near real-time graphical flood forecast products on the Internet for locations where flood forecast points have been established. Initial NWS AHPS products, which can be found via the DRBC web site, proved extremely useful during periods of high flood potential in 2003 and provided a means for local emergency officials and private citizens to keep track of flood stage forecasts.

Implementation of the DRBC flood warning recommendations is critical to further development of AHPS products in the basin. Federal funding of the AHPS program is separate from the funding required for the streamflow and precipitation gages and the topographical mapping included in the advisory committee's recommendations which also is needed to apply the full range of AHPS products.

The following progress related to the flood warning recommendations was made in 2002-2003 by member organizations of the Flood Advisory Committee:

- In the New York City reservoir watersheds located in the Upper Delaware region, the city's Department of Environmental Protection and the NWS embarked on a program to install between 15 and 30 new precipitation gages as well as upgrade existing gages to be consistent with U.S. climate reference network standards. All gages would be equipped with radio telemetry for frequent reporting. The estimated project cost is $500,000.
- In an effort to improve public education opportunities, the DRBC expanded its web site to include links to NWS flood forecast information and flood preparedness information provided by the Federal Emergency Management Agency (FEMA), Red Cross, and other organizations. DRBC staff members also participated in two local briefings related to flood warning products and flood mitigation programming. These were held in cooperation with the NWS, U.S. Geological Survey (USGS), and the Pennsylvania Emergency Management Agency, and took place in areas severely impacted by flooding from Tropical Storm Allison.
- The Delaware Geological Survey and the Office of the State Climatologist, in cooperation with the Delaware Emergency Management Agency, worked on procedures to support development of a severe weather warning system in northern New Castle County. Through a cooperative program with USGS, four stream gages in the Piedmont of northern New Castle County have been upgraded with automated data collection platforms that report stream stages at one hour intervals. These stations were equipped with phone lines allowing the gages to call specified numbers to report when critical stream stages have been reached. Real-time weather stations also have been installed in Newark and Wilmington, Del. and Longwood Gardens and Avondale, Pa. as part of the Delaware Environmental Observation System.

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Additional flood warning support outside the scope of the DRBC flood warning recommendations included:

- Installation of computerized Citizen Alert Networks by Bucks County (Pa.) and Merrill Creek Reservoir (N.J.). These systems are capable of simultaneously alerting via telephone hundreds of floodplain residents if flooding is expected in the Neshaminy Creek Watershed (Pa.) or in the communities surrounding the reservoir.
- Continued efforts by USGS, the U.S. Army Corps of Engineers, state environmental protection agencies, DRBC, and private organizations to fund the operation and maintenance of the Delaware Basin's stream gaging stations. River flood warning would not be possible without these gages, which serve multiple purposes and are often partially funded by local partners. You can learn more about the importance of stream gages on the DRBC web site at http://www.nj.gov/drbc/gage/gageshp.htm.

A view of the Delaware River Ice Jam from Morrisville, Pa. on February 20, 2003. This was a period of high flood potential due to the heavy snowpack and forecasted warmer temperatures and rain. Fortunately, flooding did not occur, but the development of new tools, such as AHPS, proved very useful in monitoring the situation. *(Photo by Gail Blum)*

Flood Mitigation

Flood mitigation includes all structural and non-structural measures which reduce the potential for flood damage. The maintenance of dams and levees, flood control reservoir operations, stormwater management, property acquisition and floodproofing, floodplain regulations, and flood mapping all contribute to flood mitigation.

Many organizations were actively involved in this important work during 2002-2003, including federal and state emergency management agencies, state environmental protection and community affairs agencies, U.S. Natural Resources Conservation Service, and academic-affiliated organizations (such as the Water Resources Agency of the University of Delaware and Temple University's Center for Sustainable Communities). Information on the specific activities of these organizations is available on their individual web sites.

The development of hazard mitigation plans required under the Disaster Mitigation Act of 2000 and the remapping of floodplains where development has impacted flood levels are important and growing components of flood mitigation work.